

A NEW SPECIES OF NEMOURIDAE (PLECOPTERA) FROM THE
GREAT DISMAL SWAMP, VIRGINIA, USA

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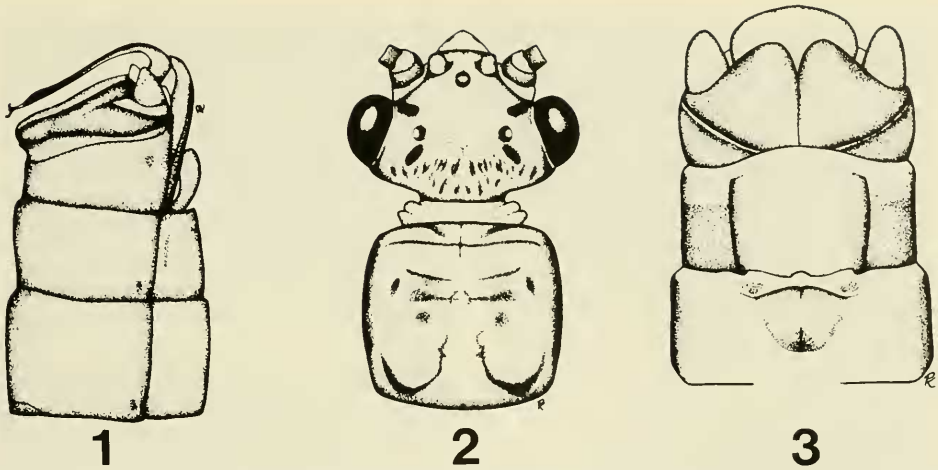
Abstract.—A new species of Nearctic Nemouridae, *Prostoia hallasi* n. sp. is described and figured from specimens collected from the Great Dismal Swamp in southeastern Virginia. Characters separating this species from other *Prostoia* are illustrated by drawings and scanning electron micrographs. Other Nemouridae associated with the new species are reported and comments are made on its atypical habitat.

The Great Dismal Swamp is situated in the Coastal Plain Physiographic province in southeastern Virginia and northeastern North Carolina. Very few points of the Swamp rise above 8 m in relief. Lake Drummond, a 1287 ha freshwater lake is located almost centrally in the Swamp. The predominant vegetation is mixed hardwoods.

Matta (1979) recently listed the aquatic insects known from the Dismal Swamp. He recorded seven orders: Ephemeroptera, Odonata, Hemiptera, Neuroptera, Trichoptera, Coleoptera, and Diptera; absent were the Plecoptera. Matta (1973) reviewed the aquatic habitats of the Dismal Swamp. The "ditches" or canals and their feeding streams apparently provide the only suitable habitats for stonefly immatures. The ditches were built by land companies for drainage and transporting lumber from the Dismal Swamp. The Washington Ditch (built in the late 1700's) was named after its presumed surveyor, George Washington. However, many of the ditches (i.e., Jericho, Lynn) have a low pH (3.5-5.5) that limits aquatic life. As Matta (1973) pointed out, ditches which have their primary drainage from the Suffolk Escarpment, such as Washington Ditch are much less acidic (pH 6-7) and have good diversity of aquatic insects.

We made several collecting trips into the Dismal Swamp and collected three species of Nemouridae, including a new species of the Nearctic genus *Prostoia* Ricker. The taxonomy of this genus has been well reviewed by Ricker (1952) and Baumann (1975). *Prostoia* presently includes three common species (Baumann, 1975). The western *P. besametsa* (Ricker) is an early spring stonefly of creeks and smaller rivers of the Coast, Cascade, Rocky and Sierra Nevada Mountains (Baumann et al., 1977, Ricker, 1964). The eastern species, *Prostoia completa* (Walker)

¹ The views of the author do not purport to reflect the position of the Department of the Army or the Department of Defense.



Figs. 1-5. *Prostoia hallasi*. 1, Male terminalia, lateral. 2, Adult head and pronotum. 3, Female terminalia, ventral.

and *P. similis* (Hagen) emerge during late winter or early spring and occur in small streams to large rivers. Morphological terms of the description follow Baumann (1975).

Prostoia hallasi Kondratieff and Kirchner NEW SPECIES

Figs. 1-6

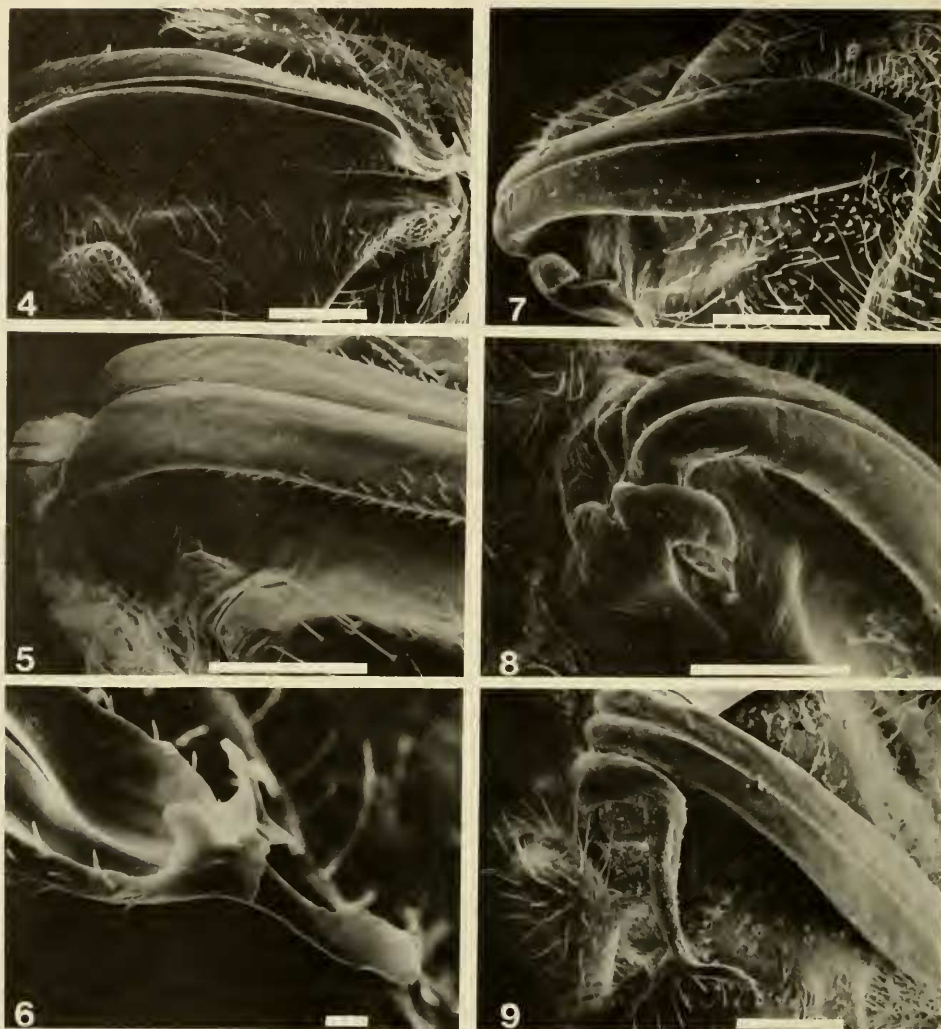
Adult.—Length of body 5–7 mm. Macropterous, length of forewings 6–7 mm, venation typical for genus; wings hyaline with fumose stripe downward from cord. Head light brown with rugosities darker brown (Fig. 2); body brown, legs yellowish-brown; abdomen with a reddish-brown tinge.

Male: Hypoproct sclerotized, broad at base, tapering to narrow apex, extending to and covering part of base of epiproct; vesicle present; paraprocts unmodified. Epiproct completely sclerotized, ventral sclerite directed upward and recurved dorsally, narrow, with sides almost parallel with stout marginal and submarginal spines dorsally and ventrally, with middorsal groove (Figs. 1, 4 and 5), apex terminating in club-like process, apex also with pair of dorsally and ventrally directed processes (Figs. 1, 4 and 6); club-like process with an opening ventrally. Dorsal sclerite without well-developed lateral arms (Figs. 1 and 5). Tenth tergum with trough-like depression beneath ventral sclerite.

Female: Seventh and eighth sterna appearing fused at midline. Subgenital plate with a small median lightly sclerotized area and notch (Fig. 3).

Nymph: Typical for the genus as described by Baumann (1975) and no reliable characters were found to consistently separate the nymph from the other two eastern species.

Specimens examined.—Holotype, allotype, 25 paratype males, 28 paratype females, Virginia: City of Suffolk, Washington Ditch, Washington Ditch Road, March 2, 1983, B. C. Kondratieff. Additional paratypes: 4 males, 2 females, same location, nymphs collected 8 February 1983 emerged 12–18 February 1983, R. F. Kirchner and B. C. Kondratieff; 2 females, same location, 17 April 1983, B.



Figs. 4–9. Scanning electron micrographs. 4, *Prostoia hallasi*, epiproct, dorsal aspect. 5, *Prostoia hallasi*, epiproct, basal view. 6, *Prostoia hallasi*, epiproct, apex. 7, *Prostoia completa*, epiproct, dorsal aspect. 8, *Prostoia completa*, epiproct, posterior view. 9, *Prostoia similis*, epiproct, dorsal aspect. All scale lines are 100 micrometers long.

C. Kondratieff and R. F. Kirchner; 1 male, Washington Ditch between Lynn and Jericho Ditches, 17 April 1983, B. C. Kondratieff and R. F. Kirchner.

Holotype (USNM TYPE #101149), allotype and several paratypes deposited in the U.S. National Museum of Natural History. Other paratypes deposited in the collections of R. W. Baumann, Brigham Young University, R. F. Kirchner, C. H. Nelson, University of Tennessee-Chattanooga, B. P. Stark, Mississippi College, and Virginia Polytechnic Institute and State University.

Etymology.—The specific name honors Dr. Laurence E. Hallas, Monsanto Agricultural Products Co., St. Louis, Missouri, a life-long friend and supporter of the senior author.

Diagnosis.—*Prostoia hallasi* is easily distinguished from all other *Prostoia* by the following characters: (1) the shape of the ventral sclerite and ornamented apex of the epiproct, (2) the lack of well-developed lateral arms of the dorsal sclerite, (3) the shape of the hypoproct, and (4) the subgenital plate of the female. *Prostoia similis* has long and slender lateral arms of the dorsal sclerite of the epiproct (Fig. 9) and lacks the ornamented apex of the epiproct. *Prostoia completa* and *P. besametsa* have a simple glabrous ventral sclerite and the lateral arms of their dorsal sclerites are represented by small curved processes (Figs. 7 and 8).

Ecological notes.—*Prostoia hallasi* was collected along the Washington Ditch to just beyond the intersection of Lynn Ditch (see Matta (1973) Fig. 1). Other species of Nemouridae occurring commonly with *P. hallasi* were *Shipsa rotunda* Claassen and *Amphinemura nigratta* (Provancher). Two caddisflies, *Polycentropus crassicornis* Walker (Polycentropodidae) and *Rhyacophila* sp. near *ledra* Ross (Rhyacophilidae) were also abundant. The immatures of these taxa were found among leaf packs, debris and aquatic moss in Washington Ditch. Adults of Nemouridae were commonly collected on bald cypress knees and other tree trunks in the early morning. All these taxa apparently emerge very early in the year (February–April) taking advantage of seasonal cool water and air temperatures and much higher, sustained stream flows. Water quality and flow of Washington Ditch deteriorates rapidly during the summer, factors that probably eliminate additional taxa.

ACKNOWLEDGMENTS

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